

## HITTING GERMS WHERE THEY LIVE

Hospitals, acting together, can control drug-resistant bacteria

[The Partnership Policy Center seeks to involve the business community in key sectors of New York's economy where we believe our engagement can make a positive difference. On December 12, 1997, the Policy Center held a forum on the spread of drug-resistant infections within hospitals, an issue of great consequence to our medical institutions and public health. Participants in the forum agreed that a collaboration of business, medical, public health, and government leaders would be the most effective way to address this emerging health problem, and that the Partnership Policy Center should lead the effort. The following is adapted from the proceedings of the forum, convened at Manhattan's Sky Club and cosponsored by the Albert and Mary Lasker Foundation.]

[Participants included: Ira Millstein, Joshua Lederberg, Robert J. Rubin, Stuart Levy, Alexander Tomasz and Barry Kreiswirth ]

### J Lederberg comments:

The development of those wonder drugs we take for granted today, antibiotics, is actually a phenomenon within my own lifetime. I can recall as a kid reading about this great wonder drug, prontosil, which had been developed by German chemists on a totally erroneous theory. It was one of a number of dyestuffs that had been tested for antibacterial activity following Paul Ehrlich's notion that if a chemical can stain something specifically, maybe it can kill it specifically. Well, it turned out that wasn't the case. Prontosil was really sulfonamide cloaked in a dye capsule, but it provided very important help in a number of infections. You may recall World War II action movies in which sulfonamide was dusted into the wounds of soldiers and prevented them from getting gangrene. About ten years from the time of its introduction, one began to see the first glimmers of sulfonamide resistance appearing in a variety of organisms.

Alexander Fleming discovered penicillin in 1928, but then it was a laboratory curiosity because of the difficulties of extracting and purifying a rather unstable molecule. Developing the drug became a very high priority, a war-related technology and an exercise in British-American cooperation. Had it not been for World War II, there might never have been the level of investment needed to carry it off. Penicillin was the next great wonder drug, and became common currency.

And again, it wasn't quite ten years before we began to see the first significant signs of the development of resistance in a variety of places. It was not a major problem to start with, but it was an escalating one, and through the 1950s it became sufficiently serious that new generations of beta-lactam had to be invented in order to keep up with the development of resistance. It's been a constant race because -- surprise, surprise! -- bacteria are not sitting targets, they're evolving. They're part of an evolutionary process in which

we've become the major ecological actors by altering the environments in which they operate, most notably by pouring tons of these very potent materials, sometimes productively, sometimes unproductively, into an environment that is full of bugs of all kinds. We do this because we want to select out dangerous pathogens, yet then we discover to our dismay that it's very, very difficult to eradicate any bacterial species. They fight back.

And it's been a somewhat latter-day discovery that drug resistance is not simply a question of natural selection working on a targeted pathogen, but that pathogenic bacteria and non-pathogenic bacteria exchange plasmids with one another, so the development of resistance in one species can promote the spread of resistance in others.

The problem has become more and more serious. It's especially focused in hospitals because of the concentration of antibiotic drugs there. Hospital staff and patients themselves are moving around, and even when they take moderate precautions against further spread, they're acting as the vectors of disease.

So in a number of respects a hospital is getting to be a rather dangerous place to go. We obviously have to shake that image and reality if hospitals are to perform their necessary social function and continue to enjoy public confidence and support. For that to happen, we need more information, and one of the main thrusts behind this meeting is to try to find a fair way to facilitate the recording, the indexing, and the sharing of information so there can be an effective, collective answer to the development of drug resistance -- which, if left unchecked, will frustrate us mortally in our ability to use these agents for protection against disease.

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JL:

If these dangerous organisms had different names and were reportable diseases, we'd be sending up red flags of the most urgent kind. Contrast the first patient who comes along with a high level of vancomycin-resistant staphylococcus and a patient labeled as having the Ebola virus. But the threat to the community from an individual with vancomycin-resistant staphylococcus is probably substantially larger than Ebola. Despite all the publicity, Ebola can be contained by standard infection control procedures. Outbreaks have not spread to other continents. But unless we change our practices severely, we're not going to contain the spread of the next occurrence of vancomycin-resistant staph.

Infection control practices in hospitals are one point of consideration. I'm not an expert on this matter, but I read quite alarming things from time to time in the medical literature about the frequency with which health care workers at every level -- and I'm not sure that docs aren't the worst offenders in this regard -- neglect to wash their hands when they go from one patient to another. Then there's the mythology that if you put on gloves, they're going to protect the next person you're going to see. They obviously won't if you don't change them.

Can we find the sources of new infectious agents among health care attendants, among visitors, in the ambient environment of a hospital? Very few places have ever done that. You track the

bugs that are sent down to the diagnostic laboratory because there's a problem in the patient. We don't have a lot of insight into the detailed traffic, into where the perps are hiding and where they're moving around. We're never going to get it unless we adopt a concerted attitude that this information has to be gotten.

Do any of us want to advertise ourselves as a place with a high level of methicillin-resistant staph? We'd better watch out about that. Can we rely on the confidentiality of the system if we share information? Reasonably but not perfectly. Nobody can give absolute guarantees that that kind of information isn't going to get out.

But there may be a negative side to keeping it as a secret. I think of a Libby Zion kind of case. Imagine an infection-oriented scenario where the plaintiff is able to bring out that a hospital did have information that might bear on the spread of resistant organisms, but didn't share it with the rest of the community. That might not bear directly on culpability in an individual case, but it sure could make a hell of an impact on a jury pondering whether to add punitive damages to the compensatory ones if there was knowledge about what might have been done to minimize the opportunities for the spread of infection, and that was not only neglected but actively resisted.

There's an act that's got to be cleaned up here. Although all of us would greatly prefer an effective voluntary system, it's only a matter of time before compulsion of the ugliest sort enters in.

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JL comments:

Everything has to be considered, but only when we have the data to understand what the patterns of spread are and what draconian measures are going to accomplish.